REMARKS

I. INTRODUCTION

For the reasons set forth below, Applicants respectfully submit that the pending claims are patentable over the cited prior art references.

II. The Rejection of Claims 1-3 and 13-15 under 35 U.S.C. § 103

The Examiner has rejected claims 1-3 and 13-15 under 35 U.S.C. § 103 as being unpatentable over Awata in view of the "Encyclopedia of Polymer Science and Engineering" (hereinafter "EPSE"). The rejection is respectfully traversed for at least the following reasons.

In accordance with the present invention as recited by the rejected claims 1, 2 and 13, the recited **first support layer** comprises a plastic film having a glass transition point of **87° C or higher**, and the recited **third protective layer** comprises a plastic film having a glass transition point of **87° C or higher**, respectively. By utilizing a first support layer and a third protective layer having the recited glass transition point, when utilized in higher temperature, the degree of thermal expansion or shrinkage of both layers is very small, thus preventing the cracking of the foregoing layers and obtaining excellent insulating performance (see e.g., page 13 lines 3-7 and page 19, lines 1-8).

The Examiner admits that Awata does not disclose a protective layer having a glass transition temperature of 87° C or higher. The Examiner therefore relies on the EPSE for disclosing that polyethylene terephthalate polymers have glass transition temperatures ranging from 67° C -140° C, and thereby modifies Awata by replacing the protective layer thereof as having a glass transition temperature ranging from 67° C -140° C. The Examiner's asserted motivation is that the glass transition temperature would be readily determined through routine

optimization by one having ordinary skill in the art depending on the desired end use of the product. However, it is respectfully submitted that the Examiner's conclusion is in error.

Specifically, Awata is directed to a vacuum heat insulator having a three-layer structure composed of plastics at the ends and one of metal foil or vapor-depositing a metal or metal oxide between the plastics. Particularly, the plastic film has "gas barrier performance and flexibility," wherein the plastic film is identified as polyester, polypropylene, polyvinylidene chloride film. Accordingly, the insulator disclosed in Awata is applicable to electric refrigerators, refrigeration vehicles, railroad refrigerator cars. **However, nowhere in the disclosure does it suggest any use of high temperature nor is there any glass transition point of plastic film being utilized**. In fact, as asserted by the Examiner, **Awata does not disclose any glass transition point**. Accordingly, Awata does not provide any reasons or motivation for employing a protective layer having a glass transition point of 87° C or higher because there is no disclosed need or desire (i.e.. no advantages such as cracking prevention) for making such modification by combining with the EPSE reference.

The only motivation for making the combination is derived from Applicants' specification. That is, the proposed combination is improperly based solely on improper hindsight reasoning, whereby the Examiner selected bits and pieces of the prior art and used only Applicants' specification as a guide to reconstruct the claimed invention. As described throughout Applicants' specification, one of the advantages of the present invention is related to using a plastic film having a glass transition point of 87° C or higher so that the cracking of the layers at high temperature can be prevented. As discussed above, Awata appears to be completely silent as to using any glass transition point for any desired effects.

In contrast, the Applicants have discovered that in the conventional vacuum heat insulator, due to difference in coefficient of thermal expansion between the layers, cracks are often formed at high temperature, preventing the insulator to operate desirably. Especially when thermal stress is applied, the insulating performance of the vacuum heat insulator deteriorates, (see, e.g., page 3 of specification). Furthermore, plastic material is known to expand when heated. Since the stress given to the plastic film in its manufacturing process remains therein, sometimes it contracts significantly when heat is provided. In particular, the contraction of the plastic film is significant at a temperature exceeding 80° C. Therefore, employing the use of a plastic film having a glass transition point of 87 ° C or higher increases dimensional stability of the film and also prevents the occurrence of cracking on the deposition layer, thereby realizing a vacuum heat insulator having higher heat resistance and durability.

Turning to the EPSE reference, this reference discloses that the glass transition of commercially available PET material varies over a wide range of temperatures, where this value depends on polymer purity, degree of crystallinity, sample annealing and method of determination. The Examiner's citation of the protective layer having a glass transition temperature of 67° C to 140° C is taken completely out of context, and the motivation of routine optimization have absolutely nothing to do with selecting a glass transition point for preventing cracks. Specifically, this section of the EPSE is relevant to disclosing the probable operating range of the parameter T_g. Careful examination of the description of this section reveals that it only teaches a glass transition point that is capable to be operated in this temperature range. Nowhere in the disclosure does it suggest the cracking of the support layer and the protective layer due to the inflation of the plastic film when the heat is applied beyond the glass transition temperature. Therefore, there is no objective reason on the record to combine the teachings of the

cited prior arts so as to modify Awata with a glass transition point of 87° C or higher to arrive at the claimed subject matter. .

Even assuming *aguendo* that there was proper motivation to combine Awata and the EPSE, the combination does not necessarily result in the claimed invention. Indeed, it is possible that the resulting combination would utilize a PET film having a glass transition temperature which is lower than 87° C, as the reference discloses a possible range as low as 67° C.

It is well known that in order to establish a *prima facie* case of obviousness, each and every limitation of the claimed invention must be disclosed or suggested by the cited prior art (see, **M.P.E.P. § 2143.03**). In the instant case, it is clear that this requirement is not met because the combination does not necessarily result in the use of a PET film having a glass transition temperature of **87° C or higher**. Moreover, neither of the references even appear to acknowledge the problem avoided by the present invention by utilizing a PET having the claimed glass transition temperature. As such, for this reason alone, claims 2 and 13 are patentable over the cited prior art references.

The Examiner is also directed to **M.P.E.P. § 2131.03** under the headings "OPTIMIZATION OF RANGES" which set forth the applicable standard:

> In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity" to constitute an anticipation under the statute." What constitutes a "sufficient specificity" is fact dependent. If the claims are directed to a narrow range, the reference teaches a broad range, and there is evidence of unexpected results within the claimed narrow range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. The unexpected results may also render the claims unobvious.

In the instant case, it is respectfully submitted that the present invention exhibits unexpected, critical and superior results. As shown, for example, on page 19-24 of Applicants'

specification, an experiment was conducted to verify the effects of the high temperature durability test at both 85 to 100° C. Specifically, test sample 1 has three sides of the laminate film as shown in Fig. 1A of Applicants' drawings. The laminate film is heated and fused with the seal layer overlapped inside, and the laminate bag is filled with silica powder as an insulating core. Test sample 2 has the same structure, but the laminate film is heated and fused with the heat fusion layer overlapped inside instead. Test sample 3 has the same composition as test sample 1, with the exception that the support layer is a PET film and the protective layer is 6-Nylon. The prepared samples were then measured in the steps as disclosed on page 21. The measurement results, as readily shown in Table 2 of page 23, disclose that in samples B, D and E of test sample 1 using polyethylene napthalate resin of which glass transition point is 121° C as support layer or protective layer, excellent gas barrier performance and degree of vacuum are maintained even after high temperature durability test at both 85° C and 100° C. In samples A and C of test sample 1 using polyphenylene sulfide resin having a glass transition point of 87 ° C as a support layer or protective layer, excellent gas barrier performance and degree of vacuum are maintained even after high temperature durability test at both 85° C. In sample E of test sample 1 using polyethylene sulfide resin having a glass transition point of 87° C as support layer and protective layer, excellent gas barrier performance and degree of vacuum are maintained even after high temperature durability test at 100° C.

As a result, the Applicants have demonstrated that the vacuum heat insulator of the present invention exhibits critical and superior results in maintaining an excellent insulating performance for a long period as the insulator for device having high temperature when the glass transition point of the first support layer or the third protective layer is 87 ° C or higher, and not

simply a routine optimization as asserted by the Examiner. For these foregoing reasons, it is respectfully submitted that the present invention is patentably distinct over the cited prior art.

It is further noted that claims 2 and 13 recite a first support layer and a third protective layer. The Examiner is directed to **M.P.E.P § 2143.03** under the section entitled "All Claim Limitations Must Be Taught or Suggested", which sets forth the applicable standard:

> To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (citing *In re Royka*, 180 USPQ 580 (CCPA 1974)).

In the instant case, the pending rejection does not "establish *prima facie* obviousness of [the] claimed invention" as recited in claim 2 because the proposed combination fails the "all the claim limitations" standard required under 35 U.S.C. § 103. Specifically, The Examiner has only addressed the protective layer as recited in claim 13 (see page 3 of Office Action) and it does not appear that the support layer having a glass transition point of 87° C or higher is disclosed.

For at least these foregoing reasons, it is respectfully submitted that the present invention is patentably distinct over the cited prior art.

III. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, ***Hartness International Inc. v. Simplimatic Engineering Co.***, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 1, 2 and 13 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also in condition for allowance.

It is further noted that claim 14, which depends on claim 13, recites that the first support layer has a glass transition point of 87° C or higher. Both Awata and Cheng appear to fail to disclose this limitation.

Furthermore, the Examiner has rejected claims 4 and 16 under 35 U.S.C. § 103 over Awata in view of Cheng et al. This rejection is respectfully traversed for the following reasons. The Examiner admits that Awata does not disclose a film comprising polycarbonate. The Examiner therefore relies on Cheng et al. for disclosing polycarbonate as an equivalent to the material used in Awata, and thereby modifies Awata by replacing the material thereof with the polycarbonate disclosed by Cheng et al. The Examiner's asserted motivation is "to make an insulator which is readily molded or shaped." However, Cheng et al. appears to list both polyethylene terephthalate and polycarbonate as being "readily moldable or shapable" with no apparent differentiation therebetween. In fact, as asserted by the Examiner himself, Cheng et al. appears to merely suggest that the two are equivalent for their disclosed purpose. Accordingly, it is respectfully submitted that Cheng et al. does not provide any motivation or rationale for replacing the alleged polyethylene terephthalate of Awata with polycarbonate because there is no disclosed need or desire (i.e., no advantages) for making such a modification.

In sum, it is submitted that the proposed combination is improper because the Examiner has not provided the requisite ***objective*** evidence ***from the prior art*** that "suggests the desirability" of the proposed combination. As is well known in patent law, a *prima facie* showing of obviousness can only be established if the prior art "suggests the desirability" of the proposed combination using ***objective*** evidence. The Examiner is directed to **M.P.E.P. § 2143.01** under the subsection entitled "Fact that References Can Be Combined or Modified is Not Sufficient to Establish *Prima Facie* Obviousness", which sets forth the applicable standard:

> The mere fact that references <u>can</u> be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. (*In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990)).

In the instant case, even assuming *arguendo* that Awata can be modified by Cheng et al., it is submitted that the "mere fact that [Awata and Cheng et al.] can be combined ... does not render the resultant combination obvious" because nowhere does the ***prior art*** "suggest the desirability of the combination" as set forth by the Examiner. In contrast, Cheng et al. is completely silent as to any benefits of using polycarbonate in place of the alleged polyethylene terephthalate used in Awata. As mentioned above, Cheng et al. does not appear to differentiate between polycarbonate and the polyethylene terephthalate. Only Applicants' specification provides the requisite motivation for using polycarbonate in the claimed combination. Accordingly, it is submitted that the cited prior art does not provide any motivation or rationale as to why one would want to use polycarbonate rather than polyethylene terephthalate.

Based on all the foregoing, it is respectfully requested that the rejection of claims 4 and 16 under 35 U.S.C. § 103 over Awata in view of Cheng et al., be withdrawn.

IV. Request For Notice Of Allowance

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, an additional petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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